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# OE-1 Enhanced Evaluation of Beyond Design Basis Events (BDBE)

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# Beyond Design Basis Event (BDBE) Review

- The BDBE report provides:
  - Summary of select Design Basis Accidents (DBAs) and BDBEs evaluated in respective DSAs for events listed in OE-1
  - Identification of “next-higher-level” event for enhanced BDBE evaluation
  - Results of enhanced BDBE evaluation
  - Identification of any Essential Structures, Systems and Components (ESSCs) that should be considered for margins assessment
  - Proposed Items for Facility and Emergency Response Management consideration that could enhance BDBE response capabilities
- Report will serve as input for identifying potential changes to DSA BDBE discussions for the 2015 annual update cycle.

# BDBE Review – Facilities

- **Focused on HC-2 nuclear facilities that have the potential to exceed DOE's 25 rem public dose evaluation guideline based on an unmitigated accident analysis**
  - Plutonium Facility (B332)
  - Waste Storage Facilities (WSF)

# BDBE Review - Background

- HSS Issued OE-1: 2013-01, *Improving Department of Energy Capabilities for Mitigating Beyond Design Basis Events*
- DOE Training elaborated on AU-30 expectations
  - *Evaluation of Beyond Design Basis Events, October 2013*
- LLNL ITS 36637, *Operating Experience Level 1: Improving Capabilities for Mitigating Beyond Design Basis Events*
  - ITS 36637.1.4 is to report to Emergency Management on the summary of scenarios, an enhanced evaluation of BDBEs

# BDBE Review – Potential Event Types

- **HSS OE-1 report and DOE Training identified the following accident types**
  - **Seismic events (1)**
  - **Floods (2)**
  - **Fires**
  - **Lightning**
  - **Wind and Tornadoes (3)**
  - **Snow and ice**
  - **Ash fall**
  - **Accidental Aircraft Crash**
  - **Station Blackout**
  - **Cascading Events**

# BDBE Review – Related Events

- For initiators with the potential to cause other events, combination events were evaluated under that initiator
- Example: Seismic
  - Equipment failures (Safety SSCs, process-specific, balance of plant)
  - Fires
  - Station blackout
  - Water leaks (i.e., small floods)



# Essential SSCs (ESSCs)

- Undefined term used in the DOE Training on OE-1
- Used in a general sense to denote potentially important SSCs
- Intent is not to credit ESSCs in the DSA, but to identify ESSCs to consider for qualitative margins assessment based upon expert judgment
  - Those whose failure could yield site boundary doses in excess of 25 rem
  - Safety SSCs and other SSCs were reviewed on a scenario-specific basis as part of the enhanced evaluation

# Results of Enhanced Evaluation

- Does not materially alter the conclusions of the B332 and WSF DSAs
- No “cliff edge” vulnerabilities were identified
- Seismic is the dominant BDBE of concern
- Only specific DSA change proposed is update and clarification of the B332 seismic BDBE

# Results of Enhanced Evaluation (cont.)

- No ESSCs identified for margins assessment for the WSF
- Four ESSCs in B332 identified for margins assessment
  - Building Structure (already has margins assessment)
  - Three other SSCs

# **BDBEs That Don't Have a Hypothetical Potential to Exceed 25 Rem**

- **Floods**
- **Fires**
- **Lightning**
- **Wind and Tornadoes**
- **Snow and Ice**
- **Ash Fall**
- **Station Blackout**

# Items for Facility and Emergency Management Consideration

- **Seismic - Eleven**
- **Station Blackout - Five**
- **Floods - Four**
- **Fires - Two**
- **Lighting & Wind – One**
- **Snow, Ash Fall & Aircraft Crash - None**

# Example Items for Consideration - Seismic

- **Portable generator capability on site, fuel availability, and means to deliver fuel**
- **Compatibility of facility electrical connections with portable generators**
- **Contingency plans for firefighting water (e.g., alternate site fire main lineups, Lake Haussman)**
- **Ease of availability of site utility information for cutting off natural gas lines**
- **Facility-specific accessibility issues post-seismic**

# Example Items for Consideration - Flood

- **Availability of sandbags and fill capacity from planned source**
- **Facility response protocols to a developing flood situation**
- **LLNL response protocols for a developing flood situation (e.g., unblock arroyo, monitor water prior to release at select locations)**